

SUPPORT FOR THE AMENDMENT

This Amendment cancels Claims 31-32; amends Claims 5 and 29; and adds new Claims 33-37. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 5 is found in the specification at least at page 18, line 18. Support for new Claims 38-42 is found in Claims 31, 12, 15, 19 and 29, respectively. New Claims 38-42 correspond to Claims 33-37, which the Advisory Action dated January 18, 2005, indicates were never entered. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-7, 9, 11-20, 28-30 and 38-42 will be pending in this application. Claims 1, 5, 6 and 38 are independent. Claims 9, 14-20 and 28-30 are withdrawn from consideration.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Applicants thank the Examiner for the indication that Claims 1, 2, 3, 4, 6, 7, 11 and 13 are allowed. Final Rejection at page 4, section 4.

The present invention provides a polishing liquid composition that, when used to polish a surface comprising an insulating layer and a metal layer, prevents the occurrence of dishing.

Claims 5, 12 and 31-32 are rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,783,489 ("Kaufman-489"). In addition, Claim 31 is objected to. Claims 31-32 are canceled, so the rejection of Claims 31-32 and objection are moot and should be withdrawn. Applicants respectfully traverse the rejection as it applies to independent Claim 5 and to Claim 12, which depends from Claim 5.

The invention of the Claim 5, as amended, has various excellent effects:

Since the polishing liquid composition of the present invention is used for polishing a surface to be polished comprising an insulating layer and a metal layer, there are exhibited such effects that the polishing speed of the metal film is maintained, that the etching speed is suppressed, and defects such as dishing in the interconnection metal layer is not generated. Specification on page 62, lines 8-12

On the other hand, in Kaufman-489, a polishing slurry containing succinic acid as an organic acid is applied to Al, Ti, TiN and SiO₂ blanket coated wafers and is used for polishing (Example 2). At the time Kaufman-489 was filed, embedded type (damascene) interconnection metal layers were made of Al.

In this field of art, in order to realize copper fine interconnection which cannot be easily subjected to dry etching, a copper embedding interconnection layer has been developed. As compared to Al, the copper or copper alloy layer is easily subjected to chemical etching. Therefore, when the composition of Kaufman-489's Example 2 is applied to copper, excessive chemical etching takes place, thereby causing the problem of dishing.

For instance, the organic acids disclosed in the Kaufman-489, alone (Comparative Examples I-3, II-2, II-3, and II-5 of the present specification) or even in admixture of two kinds (Comparative Example I-6 of the present specification), cause excessive chemical etching, so that the problem of dishing is generated in the same manner as above.

Therefore, one of ordinary skill in the art would not be motivated in how the organic acid or the like is selected and combined, when all the polishing slurries disclosed in the Kaufman-489 are for polishing a surface to be polished having a layer made of copper or copper alloy.

In other words, the problem caused by polishing a surface to be polished having a layer made of copper or copper alloy is not found in Kaufman-489, and is a new problem.

In fact, succinic acid used in Example 2 of Kaufman-489 is merely an application of a known technique (see Kaufman-489 at column 6, lines 22-28), not showing a novel technical idea for solving the problem of the present invention.

Therefore, one of ordinary skill in the art cannot readily find the problem of the present invention simply from the disclosure of Kaufman-489, and its probability is rather low. Also, since the combinations of specified organic acids as taught in the present invention are neither disclosed nor suggested by Kaufman-489, one of ordinary skill in the art would not be motivated to make such combinations.

By contrast, since the polishing liquid composition of the present invention comprises a specified combination of organic acids as defined in claim 5, even when a surface to be polished having a layer made of copper or a copper alloy layer is to be polished, the problem of excess chemical etching is remarkably mitigated, so that the dishing can be suppressed to a low level under an excellent polishing rate (see each Example of the present invention).

Therefore, one of ordinary skill in the art cannot readily arrive at the present invention based on Kaufman-489 because the effects exhibited by the present invention are highly remarkable especially in the polishing of a surface to be polished having a copper or a copper-containing metal disclosed in Kaufman-489. Thus, the rejection of Claims 5 and 12 over Kaufman-489 should be withdrawn.

Kaufmann-489 also fails to disclose or exemplify the specific combination of acids of new independent Claim 38 of an (i) aliphatic carboxylic acid having 7 to 24 carbon atoms and/or a salt thereof and (ii) the recited etching agent. Claim 38's acids synergistically combine to maintain a practical polishing speed while avoiding excessive etching of a metal layer, which leads to undesirable dishing. See, e.g., specification at page 18, lines 1-10. Given the large number of acid combinations possible from Kaufman-489's list of acids at column 6, lines 1-13, there is no reasonable expectation that Kaufman-489 would

successfully lead the skilled artisan to the Claim 38 combination of acids (i) and (ii) necessary to both maintain polishing speed and prevent dishing.

Pursuant to M.P.E.P. § 821.04, after independent product Claims 1, 5, 6 and 38 are allowed, Applicants respectfully request rejoinder, examination and allowance of withdrawn method Claims 9, 14-20 and 28-30, which include all of the limitations of independent product Claims 1, 5 and 6, respectively; and examination and allowance of new method Claims 40-42, which include all of the limitations of independent product Claim 38.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

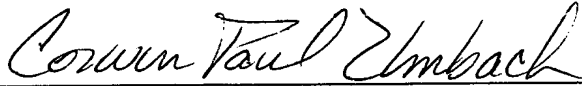
Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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